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ABSTRACT

While notable advances in astronomy, nuclear physics, microbiology, and computer technology seem to contribute to the possibility of human betterment, each of these advances involves hazards, the most ominous being their application to warfare. While considering the wonders and hazards of scientific advance, it is necessary to consider the less frequent, less compelling, and less visible advances made by the social sciences. The social sciences have not had the close relationship to warfare that the natural sciences have. The fault of the social sciences is not so much misapplication as it is nonapplication. It may be that natural science is the science of war, while social science is the science of peace. Unwillingness of decision-makers to apply social science has led to failure to deal effectively with world problems. Within the disciplines of social science and education, the available energy and resources to make practical applications to improve the human lot at home and abroad are poorly and inefficiently positioned. The challenge of worldwide progress in economic and social affairs remains, along with the tools and knowledge to accomplish it. Only an invigorated will is needed to continue the process. One of the most hopeful thrusts on the educational scene is the persistence of continuing development and dissemination of materials on global education by individuals and groups. (LH)

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SCIENCE AND SOCIAL SCIENCE IN A WORLD PERSPECTIVE

by Irving Morrissett

Annual Conference of the
Social Science Education Consortium, Inc.
Athens, Georgia
June 10, 1983

When I first talked with Jon Miller about our giving these papers on the theme of "The Social Study of Science and Society," I had in mind a review of the methods and substance of our recent CREST Project--"Creative Role-Playing Experiences in Science and Technology." The ten modules created in that project deal with ten important social dilemmas facing our country. They include a wealth of data related to those problems and well-structured roles and settings for wrestling with them. The issues include matters related to toxic waste, recombinant DNA, acid rain, product liability, and energy sources. The more I thought about that approach, the more I was concerned with the fact that these ten problems, important as they are in relating science to society, are overshadowed by world problems of science and society.

Thus, I found myself moving far toward the theme of next year's conference: "How Does the School Curriculum Respond to Global Challenges: The Controversies on Peace and Security, Environmental Problems, Economic Problems, and Third World Issues." I hope this will be a useful bridge to that conference.

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Two of the most fascinating areas of knowledge today, characterized by exciting discoveries taking place at a rapid rate, are astronomy and microbiology. In astronomy, the study of increasingly strange objects and phenomena throughout the universe--pulsars, quasars, black holes, and radio and X-ray transmissions--is adding to both our wonderment and knowledge of the universe. Rapid extension of our depth of observation of the universe, from one or two billion light-years not long ago to ten and possibly more light-years now, gives us an increasingly narrow fix on the origin of

today's universe in the Big Bang of 18 or 20 billion years ago. Mysteries and knowledge deepen simultaneously. What could have existed before the Big Bang? Was antimatter created in great quantities at the Big Bang? If so, what happened to it? Is there no limit to the diversity of stages and movement of matter that can exist in the universe?

At the other end of the spectrum of size, microbiology has been making comparable advances. Following discovery of the double helix and DNA a quarter-century ago, microbiologists have learned with increasing precision how to splice in segments of DNA to control the reproduction of characteristics in an increasing number of forms of life. Potentialities now viewed with optimism include applications in medicine, agriculture, chemistry, and natural resource recovery that could make incalculable contributions to human health and welfare. Applications to animal husbandry and human eugenics are a little farther in the future.

Notable advances are also taking place, less spectacularly, in cybernetics (or automation), medicine, and nuclear physics.

Current advances in computer technology are comparable to those in astronomy and microbiology. The incredible miniaturization of computer elements that hold increasing quantities of data and capacities for manipulation does not yet seem to be approaching its limit. Molecular computers, now more in the feasibility than in the development stage, would have individual molecules performing the functions of diodes and would have the size relationship to present-day finger-nail-size chips that these chips have to the giant Illiac of the 1940s.

Computers are, however, of a different genre than astronomy and microbiology. They are primarily tools. Computer science is a science in its own right, but mainly a science producing a technology that aids other sciences. It contributes wondrously now to the tasks of other sciences--to the creation of new knowledge, to communication of that knowledge, and to application of that knowledge.

These scientific advances, like all scientific advances, have their positive and negative aspects. Nuclear physics has made great contributions to medicine and still holds promises of vast resources of inexpensive energy. It has also advanced the technology of war to the point where the whole human race could be destroyed in infinitely less time than it took Hannibal to cross the Alps.

Astronomy contributes to our understanding and our sense of awe about the universe, the origins of stars and planets, and the origins of human life. It also suggests ways of hanging nuclear weapons over the heads of everyone on the globe--a sword of Damocles for every man, woman, and child.

Microbiology offers the prospect of controls over life forms that can ease the pains and enhance the joys of living. It also contains the possibility of wiping out life in case the nuclear bombs fail to do that--or of doing the job less expensively, in case that would make a difference to anyone.

Automation has contributed, and can contribute much more, to the lightening of tasks in the factory, home, and office. It also increases the deadly accuracy of guided missiles and other vehicles of war.

And so it goes. Each advance in human knowledge seems to contribute to the possibility of human betterment. It also has side effects, perhaps not confined to applications for warfare, although those applications are by far the most ominous.

Where are the social sciences in this recital of the wonders and hazards of scientific advance? The social sciences do not seem to have made exciting advances on the frontiers of knowledge that would inspire researchers, teachers, and students. Such advances and excitement may occur occasionally, associated with ideas such as those of Machiavelli, Marx, Keynes, Mead, Piaget, and perhaps even Toffler. But they seem to be less frequent and less compelling, and are not very visibly present.

Despite a lack of consistent virtuosity, each of the social sciences has advanced a great deal in the past 100 years. Economists have learned much about the structure of economic systems, the conditions of economic growth, and even how to alleviate the ills of unemployment and inflation--although perhaps lacking in ways of persuading politicians and laymen to use good economic judgment. Historians have moved far from the confines of nationalism, with its predominant emphasis on rulers and wars, to give a broader understanding of the course of human events. Political scientists know more about the power relationships of groups within and between nations and about how to make those relationships function more productively. Similarly, with respect to other intergroup relationships, sociologists and anthropologists can tell us more about the nature of families, schools, races, and other groups and institutional phenomena--and how to make them function less problematically or more productively.

Education is the eighth social science, but it differs from the others. It is related to science (and to other knowledge) in a way that is similar to the relationship of computers to knowledge. While it is a science in itself, it is primarily an instrument for advancing the tasks of other fields of knowledge--mainly to communicate other knowledge but also, importantly, to facilitate the creation and application of new knowledge.

Do the social sciences, like the natural sciences, have negative applications along with their positive applications? The answer is mostly "no." Economics and psychology, particularly, have been drafted into making war. The national income accounts and input-output analysis have helped to control the economy for military purposes, and psychology has been used to improve the morale of friends and attack the morale of enemies.

But the social sciences have not had the close relationship to warfare that the natural sciences have had. The fault of social science is not so much misapplication as it is nonapplication. Social science often meets substantial resistance when it is applied to problems such as the improvement of marriage and family life, prison reform, domestic economic growth, and better use of natural resources. To a much greater extent, it meets resistance when efforts are made to apply it to power relationships within nations and, more particularly, to power relationships between nations. Power relationships determine who will set the rules for society and, most importantly, how the economic pie will be divided. In making decisions in these realms, decision-makers may not wish to be overly burdened with considerations of equity and social harmony suggested by the social sciences.

It may not be too much to say that natural science is the science, or at least the handmaiden, of war, while social science is the science of peace. Then the ubiquity of war might be explained either by the backwardness of social science or the unwillingness of decision-makers to apply it. I think it is both, but more the latter than the former.

The propositions I have just suggested are illustrated all too clearly and sadly in the current policies of the United States. Truth is sought carefully in physical science, largely with a view to increasing military strength. How can satellites best be controlled? What is the best guidance system for a missile? How can soldiers and civilians be destroyed most effectively? In social science, truth is not only not sought, it is studiously ignored and distorted. We are told that people on our side are

good and that people on the other side are bad. We are told that small or nonexistent improvements in the lot of people living under harsh dictatorships or elitist groups justify our support of those dictatorships, provided they are thought to be militarily on our side, while potential or actual improvements in the condition of people in other countries, no matter how large, are given no consideration, if those countries are seen as the enemy. We are given tragically false impressions about the dangers of nuclear war and of survival after such a war. The most deadly weapon in human history is referred to as the "peacekeeper."

Negotiation, the essential element in resolving conflicts peacefully and moving toward social harmony in the world, is systematically put aside, even with those nations with whom we have the most peaceful relations. Our communications with our friends--most of whom are erstwhile enemies--are primarily to persuade them to our points of view--to increase their armaments and accept ours according to our specifications, to control their trade as we want it controlled, and to harm the nations we are trying to harm.

Negotiation with our designated enemies is ruled out even more firmly. With some, we say we will negotiate, but "not at gun point," which can only mean that we will negotiate when we have guns and they don't, a circumstance more likely to lead to one-sided and oppressive decision-making than to negotiation. With others, in a somewhat similar fashion, we say (or we mean) that we will negotiate only if we have superior military power--a requirement much more likely to lead to impasse and war than to negotiation.

Our reluctance and refusal to negotiate is reflected systematically in our relationship with the United Nations. In many respects, the United States has cooperated with the United Nations, in supporting activities of U.N. agencies such as the World Health Organization, UNESCO, and the International Labor Organization. But as we move from sharing statistics and technical assistance to sharing economic gains and goals, we are much less supportive; with respect to peacekeeping activities we have almost completely ignored and bypassed the United Nations. The U.S. undertook the war in Korea with only ex post and nominal participation of the U.N. In Vietnam and more recently in Lebanon and Central America, we have completely ignored the possibility of resolving conflicts through the United Nations. All this is ominously summed up in the President's recent statement that

the United States must shoulder the burden of peace and freedom for the whole world. It is ominous because the United States, with all its wealth, high levels of education, and humanistic domestic institutions and policies well above those of most of the world, has failed miserably throughout its history in its unilateral efforts to solve problems and improve human welfare in the many places around the world where it has intervened, and most particularly in its own neighborhood of Central America.

The impediments to improving on the dark situation I have painted are many and substantial. Our present administration seems totally bent upon a course of strictly military solutions to world problems, with concomitant repercussions on domestic society of high taxes and deficits--and probably much more inflation--to support the military endeavor. Attention is diverted and resources are drained from efforts to improve our domestic lot with respect to poverty, pollution, the environment, natural resources, civil rights, education, and many other important social spheres. The peacekeeping social sciences are pushed aside, on slim rations.

Within the disciplines of social science and education, the available energy and resources to make practical applications to improve the human lot at home and abroad are poorly and inefficiently positioned. At the university level, multidisciplinary efforts that are essential to the solving of many social problems are no more robust than they have ever been. Area studies, multidisciplinary courses, and double majors live on precariously.

The centripetal forces that work within disciplines to isolate them from other disciplines, enforced by the system for allocating salaries, credit, and prestige, may be stronger than ever. Tight funds and scarce tenure positions push scholars to ever-greater specialization in order to get publications in prestigious professional journals that give excessive attention to statistical methods and model-building, at the expense of contributions to social problem-solving.

At the school level, things are a little better. Education there is somewhat more liberal than at the university level, in the sense of attending more to a rounded education and preparing students to understand and live in the real world. But precollege education is still restricted by outmoded methods, outmoded knowledge, and timidity in exploring controversial social problems.

Is there hope for human society as we know it?

As social studies educators, as social scientists, and as members of the not-yet-extinct human race, we need to look for hopeful avenues of change. They are a little hard to find, but they do exist. Congressional resistance to the administration's military policy is weak but in the right direction; resistance to destructive changes in domestic social and educational policy is somewhat stronger. Rising concern in Western Europe and in this country about the imminent danger of nuclear war gives some hope of change in our exclusive reliance on military threats, although that is mostly a negative response and still far removed from a groundswell of demand for constructive solutions to world problems.

Throughout the fifties and sixties and into the early seventies, the international effort to support the development process in Third World countries was marked by a spirit of enthusiasm and adventure and by a fair measure of success. In this period many of the developing countries, few of whom had shared in the economic growth enjoyed by most of the Western world from the turn of the century and before, achieved sustained growth rates well above those of the prosperous industrialized countries. Domestic saving and investment rates rose and external capital was attracted. More recently, growth rates have slowed or stagnated, international aid and cooperation have diminished, and much of the spirit of self-help and help across national boundaries has flagged. Causes of these changes include worldwide slowing of growth and increasingly severe recessions, intensification of international tensions accompanied by dozens of wars and near-wars around the globe, and perhaps "aid fatigue." But much has been learned about the process of development, its feasibility, and the elevation of hope that may go with it. The challenge of worldwide progress in economic and social affairs remains, along with the tools and knowledge to accomplish it. Only a reinvigorated will is needed to continue the process.

In education, there is much room for constructive work. The spate of reports now coming out about how bad our schooling is--including reports of the President's National Commission on Excellence, the National Science Foundation blue ribbon panel, the College Board's Project Equality, and John Goodlad's study of schooling--may give another boost to innovative educational endeavors such as that of Sputnik 25 years ago. We already know a lot more about good education than we are using, including what we

know about participative learning, motivation, peer and cross-age learning, the structure of social knowledge and social problems, individualization, problem-solving, and modes and stages of learning. If this sounds a little like the emphases of the new social studies, new science, and new math, that is no coincidence. We have a large, unused legacy from that era, as well as much knowledge about what worked and even more knowledge about why other things did not work. (See SSEC's SPAN reports for extensive elaboration on these matters.)

One of the most hopeful thrusts on the educational scene is the persistence of continuing development and dissemination of materials on global education by individuals and groups who have not been discouraged by the flight to basics and hardback texts. Many of those individuals are members of this organization.

There are tasks to be done and there are ways of doing them. This group and the individuals here can have as much to do with those tasks and their successful outcomes as any others in the nation or the world.